

Remarks

The Applicants have amended Claim 1 by adding the subject matter of Claim 6. Claim 6 has accordingly been cancelled.

Claim 10 has been amended into independent form such that it now includes the subject matter of Claims 1 and 10 and has further been amended to include the subject matter of Claims 11 and 12. Claims 11 and 12 have accordingly been cancelled.

Claim 50 has been amended to include the subject matter of Claim 55. Claim 55 has accordingly been cancelled.

Claim 59 has been amended into independent form. It therefore contains the subject matter of Claims 50 and 59. Also, Claim 59 has been amended to include the subject matter of Claims 60 and 61. Claims 60 and 61 have accordingly been cancelled.

Claims 70 - 85 have been cancelled without prejudice and without disclaimer of the subject matter therein. The Applicants specifically reserve the right to file one or more divisional applications directed to the subject matter therein.

The Applicants respectfully request that all of the above amendments and cancellations be entered into the official file. The Applicants respectfully submit that these amendments raise no new issues and do not require further searching inasmuch as all of the subject matter of these claims has already been examined in at least dependent form.

Claims 1, 5-8, 10-12, 50, 54-57 and 59-62 stand rejected under 35 USC §103 over the hypothetical combination of Seemann with Hettinga. The Applicants respectfully submit that the rejection is now moot with respect to cancelled Claims 6, 11-12, 55 and 60-61. The Applicants also respectfully submit that the hypothetical combination is inapplicable to the remaining claims in that rejection. Reasons are set forth below.

The Applicants first note with appreciation the Examiner's frank acknowledgement that Hettinga does not teach that a discharge groove extends over the circumference of the fiber substrate and as formed on the die or the intermediate member. The Applicants agree. Thus, the rejection turns to Seemann for the use of resin grooves formed in the molding die and which are disposed about the circumference of the fiber substrate to facilitate the removal of resin to uniformly draw resin from the supply conduit through the fibers preform. The Applicants respectfully submit that one skilled in the art would not make this hypothetical combination, but in any event, the result of such a combination would still be different from the subject matter of the above-rejected claims.

First, the issue of determining what an RTM molding is should be addressed. Whether an integral molding with a fabric (fabric 17) disclosed in Hettinga corresponds to RTM molding depends on the definition of RTM molding. However, as described in paragraph [0015] of the Applicants' Specification, "Thus, in FRP molding (particularly, RTM molding), there exist proper molding conditions and material characteristic in accordance with molding size (area), and if not molded at proper conditions, problems on quality, in particular, on surface quality, are liable to occur," an optimum method is grouped depending on the kind of resin, weight of fabric to be integrated, volume content, etc. Therefore, it would indeed be quite difficult to determine only by a condition where the structures of molds are merely similar to each other.

The molding method disclosed in Hettinga relates to a plastic frame integrated with a stretchable fabric in a tensed condition and having an opening at a central portion. Hettinga only discloses that the fabric is secured by clamp 21 and central portion 22 and peripheral inclined section 23 connected to the clamp are formed (column 2, lines 30-35) and that the resin is injected into the inclined section 23 and integrated (column 2, lines 49-55).

On the other hand, the object to be molded by the Applicants is a fiber reinforced plastic with characteristics of the fiber reinforced plastic itself defined by the amount of fibers, the orientation of fibers, etc. of the reinforcing fiber substrate to be impregnated, among various fiber reinforced plastics. Therefore, if the molding conditions are not set properly, for example, in the case of a large molded product, there is a problem that "it takes much time to flow the resin, and as the case may be, the resin may reach a time of its gelation during its flow, and the resin flow stops before complete impregnation into the reinforcing substrate" (paragraph [0007] of the Applicants' Specification).

Further, there is the difficulty that "if the resin is injected at a high pressure in order to impregnate the resin in a short time, disturbance of the weave structure of a reinforcing fiber substrate may occur or voids may be generated by occurrence of a local forestalling of the resin flow and the like depending upon difference in substrate structure" (paragraph [0009] of the Applicants' Specification). Thus, if the molding conditions are different, it is a problem that the desired characteristics of the fiber reinforced plastic cannot be obtained.

As fundamentally recited in Claim 1, along the intermediate plate or the groove provided on the mold, "the resin injected, first, flows quickly in a direction along the surface of the intermediate plate 3, and the resin is delivered over a wide area. Then, because the resin is injected into reinforcing fiber substrate 9 substantially almost simultaneously from a plurality of positions through a plurality of through holes 6 provided appropriately, the resin is being well impregnated quickly into the reinforcing fiber substrate 9 over a wide area of the substrate 9" (paragraph [0084] of the Applicants' Specification).

Also, with respect to Claim 10, although the intermediate plate comprises a perforated plate or a perforated resin film, the molding method is similar to that described above (paragraph

[0088] of the Applicants' Specification). In particular, "because the flow resistance of through holes 6 is higher than that of the resin paths, the injected resin is once stored on the surface of intermediate plate 3, and the resin is then impregnated from there into reinforcing fiber substrate 9 at a time through a plurality of through holes 6" (paragraph [0084] of the Applicants' Specification). "The flow resistance of through holes 6 is higher than that of the resin paths" means that the resistance of the resin for passing through the weave structure of reinforcing fiber substrate 9 in the thickness direction of the reinforcing fiber substrate 9 is higher than the flow resistance for passing through the resin paths.

Even for the reinforcing fiber substrate 9 at such a condition, as described above, a molding method can be provided for obtaining desired characteristics of fiber reinforced plastic without generating distortions in the substrate or voids.

On the other hand, Hettinga merely discloses "inject a resin." Hettinga does not disclose how the resin is flowed relative to the inclined section 23 of the fabric 17. Moreover, although there is a description as to maintaining the state where the central portion of the fabric provided with a uniform tension (for example, column 2, lines 30-48), there is no description for the inclined section 23 integrated with the resin as to the problems that distortion may occur at the time of resin injection and that voids may be generated.

As to the discharge of excessive resin, "flash" is generally considered to remove the residual resin in the grooves for injection of resin, etc. after taking out the molded product from the mold. Paragraph [0085] of the Applicants' Specification discloses that "An excessive resin after impregnation flows a film gate/runner provided on the circumference of cavity 31, and it is discharged from discharge tube 27 to outside. After impregnation over the entire area, the discharge tube 27 is closed, and while the resin pressure is maintained, heating/curing is carried

out" at a stage impregnated into the reinforcing fiber substrate and the resin excessively injected is discharged, namely, it is controlled so that a predetermined amount of resin is injected and, therefore, it is not intended to be discharged after molding.

The Applicants respectfully submit that Hettinga does not stand as a proper basis as a primary reference for a rejection under §103 in combination with Seemann. In that regard, Seemann has additional deficiencies. Although a groove for discharging resin is disclosed in Seemann, even if the groove is applied to Hettinga, because a concrete means for integrating resin and fabric is not described, those skilled in the art would not be able to control the resin amount at a predetermined amount by discharging the excessively injected resin. Those skilled in the art can readily glean that a hypothetical combination of Seemann with Hettinga would result in a different structure. The Applicants therefore respectfully submit that the combination is inapplicable to Claims 1, 5, 7, 8, 10, 50, 54-57, 59 and 62. Withdrawal of the rejection is respectfully requested.

Claims 2, 9, 51 and 58 stand rejected under 35 USC §103 over the further hypothetical combination of Cushman with Seemann and Hettinga. The Applicants respectfully submit that Cushman fails to cure the deficiencies set forth above with respect to the combination of Seemann with Hettinga. Withdrawal of the rejection is respectfully requested.

Claims 14 and 63 stand rejected under 35 USC §103 over the further hypothetical combination of Waldrop with Seemann and Hettinga. The Applicants respectfully submit that Waldrop fails to cure the deficiencies set forth above with respect to the combination of Seemann with Hettinga. Withdrawal of the rejection is respectfully requested.

Claims 15 and 64 stand rejected under 35 USC §103 over the still further hypothetical combination of Cundiff with Waldrop, Seemann and Hettinga. The Applicants respectfully

submit that Cundiff fails to provide additional teachings or suggestions that would cure the deficiencies set forth above with respect to Seemann and Hettinga. Withdrawal of the rejection is respectfully requested.

Claim 13 stands rejected under 35 USC §103 over the further hypothetical combination of Foster with Seemann and Hettinga. The Applicants respectfully submit that Foster fails to cure the deficiencies set forth above with respect to the combination of Seemann with Hettinga. Withdrawal of the rejection is respectfully requested.

Claims 18, 19, 67, 68 and 69 stand rejected under 35 USC §103 over the further hypothetical combination of Cushman with Seemann and Hettinga. The Applicants respectfully submit that Cushman fails to cure the deficiencies set forth above with respect to the combination of Seemann and Hettinga.

Claims 20-23 stand rejected under 35 USC §103 over the further hypothetical combination of Freitas with Seemann and Hettinga. The Applicants respectfully submit that Freitas fails to cure the deficiencies set forth above with respect to the combination of Seemann and Hettinga.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury
Reg. No. 31,750
Attorney for Applicants

TDC/vp
(215) 656-3381